



Authorizations and Permits for Protected Species (APPS)

File #: 14353

Title: Humpback whale research around Maui, Hawaii

Applicant Information

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Project Information

File Number: 14353

Application Status: **Application Complete**

Project Title: Humpback whale research around Maui, Hawaii

Project Status: New

Previous Federal or State Permit: 1039-1699

Permit Requested:

- MMPA/ESA Research/Enhancement permit

Where will activities occur? International waters
US Locations including offshore waters

Research Timeframe: **Start:** 07/14/2010 **End:** 07/31/2010

Sampling Season/Project Duration:	The proposed start date of our humpback whale project is January 2010, if the permit is awarded on time, or January 2011 if not. The proposed end date is March 2015 or 2016 respectively. We plan to conduct five field seasons studying humpback whales during the months of January, February, and March in the four-island area off of Maui, Hawaii both within waters of the Hawaiian Island Humpback Whale National Marine Sanctuary (HIHWNMS) and in other adjacent waters.
Abstract:	<p>Permit proposal is to conduct studies on humpback whales from February 2010–2015 in the four-island area off Maui. The objectives of the research are: 1.) to examine underwater activity budgets (develop an underwater ethogram of behaviors and their frequency and duration) of humpback whale pods, including during non-daylight hours; 2.) to examine mother/calf/escort interactions, including sound production (types and contexts) and vocal/behavioral responses to sounds by conspecifics; and 3.) to identify more about habitat use, and, presence of any behavioral and/or acoustic reactions to passing vessel traffic. Understanding humpback whale activity budgets will assist in determining effects of vessel traffic (noise, etc.) on humpback behavior/communication in the marine sanctuary. Additionally, distribution, pod composition, and habitat use in the breeding grounds will be investigated. Tagging is a valuable tool that allows for detection of movement patterns and corresponding vocalizations at depth as well as at the surface. Underwater videography will continue to identify and classify social sounds/interactions.</p> <p>A secondary proposal is to undertake photo-ID of minke whales (<i>Balaenoptera acutorostrata</i>) as part of Tom Norris's currently funded ONR research and proposal. This has been addressed at length in the attached ONR proposal and minke whale photo-ID permit request</p>

Project Description

Purpose:	<p>Humpback whales</p> <p>Our goals for a combined study technique of tagging and underwater videography are threefold: 1.) to identify and describe underwater activity budgets of mother, calf, and escort humpback whales, including during non-daylight hours, as well as of adult whales, 2.) to continue identifying and describing social interactions between mothers and calves, and mothers and calves/escorts with an emphasis on mother/escort reactions (both behavioral and vocal) to calf social sounds, and 3.) to identify behavioral and acoustic reactions to vessel traffic, which will incorporate investigations of habitat use.</p> <p>We will test several hypotheses, some of which tier off each other. As part of goal #1, we will test the null hypothesis that no diel patterns exist in underwater behaviors or sound production. If we find that diel patterns do exist, this can help develop management policies for safe boating speeds with different times of day during the critical breeding periods for this species. As part of this, we will test whether certain consistent behaviors occur in resting pods (and where possible in active pods), and/or if they occur at certain underwater locations as described above i.e. at-depth; during surfacing; just below the surface. We will also determine if humpbacks show diel patterns of surface activities, during which they are more susceptible to ship strike.</p> <p>Also as part of goal #1 and #2, the null hypothesis we will test is that behavioral and vocal interactions do not occur between individuals, i.e. both adults and calves, and that the whales do not have different signals for different situations. Preliminary research has demonstrated the opposite (i.e. we have documented calf alarm calls; Zoidis et al. 2006), and further data may support these findings. Data collected on this project will provide valuable information into the importance of acoustic signals and the effects of noise pollution and anthropogenic disturbances on this species.</p> <p>By investigating activity budgets, we will additionally be able to determine if individual whales within conspecific groups vocalize, and if so, if these vocalizations are dependent on such factors as pod-specific behaviors, changes in group composition, activity levels, vessel traffic, etc. The null hypothesis would be that there are no correlations between certain call types, and certain behavioral contexts, or pod factors.</p> <p>All of this will enhance the survival and recovery of these species, as it will support management on every level.</p> <p>Vessel traffic is an increasing problem in the Hawaiian wintering grounds for humpback whales, causing disturbance for cows and their calves. In 2006 and 2007, 7 and 6 calves were struck, respectively (HIHWNMS 2008) including by whale watch boats. Mothers have begun to abandon their inshore protected habitats for areas with less vessel traffic. There is anecdotal data suggesting that mothers of young calves spend more time out at Lanai, potentially due to the limited vessel traffic. However, water visibility is much reduced from Lanai as compared to the coastal waters of Maui, putting calves more at risk to injury or mortality by sharks.</p> <p>Thus, understanding specific reactions to vessels of different sizes traveling at different speeds will aid in management. Once habitat use, diel patterns, and depth behavior patterns are known, mitigations can be developed to reduce these effects. Although we do not intend to systematically approach pods with different size vessels (i.e. to test reactions using controlled approaches as others have done), animals will be followed at a distance and any close approaches by other vessels will be documented, including during night-time hours. As part of goal #3, the null hypothesis we will test will evaluate data on passing vessel size, speed, and "approach behavior", comparing observed behaviors and sounds against our known baseline data for underwater behaviors, surface behaviors, and acoustic behaviors, to assess if any impacts are occurring, and if there are any patterns within these impacts (i.e. are they worse or better at certain times of the day, if the pod size is larger than 3, if the pod includes an escort, and so on).</p>
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Vessel traffic is prevalent within the Sanctuary during winter months, so we feel that establishing a vessel encounter rate for humpbacks will provide us with ample data (i.e. large enough sample size) to meet our study objectives. If, however, these methods prove too passive, we may consider instituting shore-based theodolite surveys during which we would observe whales and passing vessel traffic and record reactions if present. Later analyses of these data would allow assessment of reaction based on vessel size, speed, and proximity to the animals (after Hemphill et al., unpubl.)

We are requesting tagging takes of humpback whale mothers, calves, and escorts to gain a better understanding of behaviors, acoustics, and habitat use as mentioned above. In addition, any data we obtain will be new and unprecedented, as there has been no previous Hawaiian humpback whale mother/calf breeding ground tagging efforts. Via the continuous data logging that tagging provides, we will have a larger sample size, we will be able to sample at night, and we will sample and collect data when animals are not potentially impacted by divers in the water (i.e. they will not be displaying curious behaviors towards the diver, alarm at the divers, etc.). The tagging component will build upon other, current tagging research that to-date only documents surface behaviors, or with regards to underwater work, dive profiles, competitive group behaviors (via Crittercam) or unspecified (i.e. as to which individual) vocal recordings. It will additionally clarify our findings with regard to calf vocalizations (in which contexts calls occur, how often, during what pod behaviors or what pod compositions, etc.).

In addition, we have shown that our underwater videography methods work well for animals transmitting social sounds within 10 meters below or near/at the surface. We are currently analyzing our data to determine if social sounds have been recorded from animals when at depths > than 10 meters (to date, we have found no examples of this). It may be that our equipment cannot pick up such sounds (from that distance), in which case tagging will be much better suited for collecting such sounds, and provide new insights into at-depth social sound production.

Humpback whale – Hawaii (Central North Pacific)

In addition to providing photo-ID data, which will add to the existing SPLASH database and other local catalogues for individual animals in this area (important for enhancing population assessments, informing on reproductive success, and supporting extensive sighting histories of individual animals), tagging humpback whales will allow almost unprecedented insights into the underwater behavior of this species on the breeding grounds. Tagging mothers, calves, and escorts when possible is a natural follow-up study to our previous 5 years of in-water data collection by divers. It will greatly increase the scope of the data which we can apply to address our various hypotheses. Much data gathered on humpbacks over the last 2 decades have been largely above-water based studies, and clearly miss a large proportion of these animals' lives and behavior sets. Interactions between individuals in a pod, including mothers and calves, mothers and escorts, primary escorts and challengers, and calves and escorts, when documented, will provide information on social acoustics and behavior, of which there is a paucity. Regarding activity budgets, we will be able to more closely examine inter-group behaviors, competitive interactions, and mother/calf, or mother/calf/ escort behaviors. Other data such as respiration rates will also be obtained. We will establish an ethogram of underwater behaviors and social vocalization call types and frequencies for this species (yet to be found in the literature for this species).

Of particular interest are sub-surface movements and behavioral modifications resulting from vessel presence, an increasing and disturbing problem in the study area. It is important to assess proportion of time the animals spend just below the surface in the zone of danger for a ship strike, in addition to clarifying the behavior of mother/calf groups underwater. The detailed information currently available on this population will be greatly supported by our work, which will allow a deeper evaluation of potential impacts from human activities.

For humpback whales exclusively we propose to tag either via:

a.) deploying Crittercam on calves and/or their mothers, as well as accompanying escorts, programmed to begin recording 1 hour or more after deployment in an attempt to allow the animal to acclimate before documenting behaviors. Crittercams will be deployed during all hours of the day, with an emphasis on evenings in order to document night-time behaviors. We have already contacted the National Geographic Crittercam team and we will coordinate with Pack and the work he is doing. Specific programming of Crittercams will be discussed with the National Geographic team once a permit is obtained. Specifics to be discussed include length of deployment and programming of cameras (constant recording for 2-3 hours, 15 or 30 minute per hour duty cycling, use of night vision, etc.).

b) tag humpback whales (mothers, calves, escorts) via boat-based radio telemetry (VHF/TDRs, MANTA tags, and/or bioacoustic probes). These animals will be tracked with the motor off (unless the animals are traveling) to reduce the impact of the monitoring vessel on behavior. Neighboring vessel traffic will be closely documented, including size, speed, and distance from the animals, approach "behavior", and time of occurrence. This will allow us to observe behaviors recorded on camera during possible disturbance events to determine any impacts of the vessels on the animals. We intend to examine detailed behaviors, vocalizations, habitat use, and animal associations.

Tagging escorts, adult humpback whales, is important as it will give us information on underwater interactions in these common types of breeding ground pods (i.e. mother/calf/escort). We submit that tagging mothers and calves is justified even given their ESA listing. We have knowledge about the least impactful approach methods both above and below water, we have a proven record of disseminating our data, and most importantly, recent advancements and new technologically sophisticated tagging study methods have passed the development stage, and the application of tags has proven successful for studying pelagic whale species (Burgess et al. 1998, Hanson and Baird 1998, Baird et al. 2000, 2003a, 2008, Croll et al. 2001, Johnson and Tyack 2003, Calambokidis et al. 2004, and more). Tags allow information to be gained on the interactions between tagged animals and

their environment, and other conspecifics at a more meaningful level than "above water" work. As almost all social interactions happen out of view, and since whales spend most of their lives below the surface, tags allow data to be gathered when visual studies are impossible. Impacts are not expected, for reasons described below, and the data gained from this unprecedented tagging effort will be of great benefit to management and conservation for this species. We do not anticipate any impacts to the mother/calf bond, nor to their normal behavioral interaction beyond the short-term effects from the attachment bout. We intend to use the information gained to directly enhance the breeding habitat and to advise on policies to allow for greater recovery of humpback whales.

At present, there is great concern about the impacts of low frequency (LF) sounds on marine mammals. Due to the propagation characteristics of LF signals and the numerous human sources and activities that occur in this range (e.g. shipping, seismic/oil exploration, military operations), anthropogenic low frequency noise (LFN) is undoubtedly the most pervasive form of noise pollution in the ocean. Thus the baleen whales are expected to be the most likely group of marine mammals to be impacted by LFN. Mysticete whales are well known for their abilities to produce low frequency sounds. With little scientific information about their hearing capabilities, it must be presumed that their auditory sensitivity in the low frequency band is good to excellent. Models indicate that mysticetes (baleen whales) are unlikely to hear above 30 kHz (Richardson et al. 1995). Tagging will allow the tracking of fine-scale underwater movements allowing for more information on humpback whale behavior. In addition, attachable devices are a reliable method of recording vocal behaviors of large whales. The baseline information we will collect will provide a meaningful context to interpret any data resulting from the effects of sounds and other stimuli in the whales' environment.

The use of passive acoustics alone is not sufficient for studies on vocalizations. Whale behavior is not consistently revealed by vocalizations and if individuals are quiet, there is no information that can be gained on behaviors or activities. Thus, tagging is one of our primary research objectives in order to examine the field of sensory ecology, which will elucidate diving and behaviors of the target species, and will help us to understand the relationship between acoustic communication and these behaviors. In exploring sensory ecology through tagging, we can expand on visually-collected data and learn what the target species are doing underwater.

The rationale for the proposed underwater videography study methodology is multi-faceted. First, this methodology has been effective in collecting these sounds (by this PI under permit #s 924-1484-01 and -02, and by this PI under her own permit #1039-1699-00, as well as by current work being done by Adam Pack and other Hawaiian researchers). Diver presence has been shown by our work to not be a deterrent to social sound production. Continuing to collect social sounds from humpback whales as proposed in this study will allow us to expand upon some of the observations and results found in analyses of the data collected under the aforementioned permits and published in Zoidis et al. (2008). By analyzing videos and sound data taken in the water with the whales, a more complete picture of behavior and its relationship to sound production is expected.

Our proposed study methods will have the benefit of allowing us to answer many questions outside our three main objectives. For example, what are mother/calf or mother/calf/escort dive profiles and respiration rates? Our research supports that calves do vocalize (Zoidis et al. 2008), but do call rates correlate with other factors? Are there patterns in how vocalizations are produced? How are patterns affected by the presence of other animals? Or pod behavior? Does size or sex of the calf affect the frequency of calls? All these questions and related hypotheses will be better addressed via tagging.

The vocal behavior of whales is a subject of great interest to scientists yet there is little knowledge of when and why large whales vocalize (other than song). Further, we will be able to assess if both sexes vocalize (both calves and adults), or if there are gender-based differences in vocal behavior.

Our choice of target species is reiterated below, with details on supplemental justification. The numbers of animals to be taken are listed in Table 4 (see separate attachment). The take estimates in this table represent the maximum numbers of animals that we expect could be tagged within a given season. Based on our previous experience, type B takes (i.e. behavioral disturbance) can be expected to be 2-3 times the number actually tagged.

For the proposed study, we plan to run correlations between time of day, number of vessels within certain distances, and specific behaviors (acoustic and non, collected during tape review via ethogram). In order to determine minimum sample size, a random subset of behavior data collected between 2001 and 2007 was sampled and correlated. Correlations were run between behavioral state and several calf/diver interaction variables (i.e. calf approach diver to within 5 m, calf turn towards/away from diver, etc.) for a varying number of pods. Behaviors were recorded by number per 30 second increment of tape, with pods used chosen via random number generator. Significant correlations ($p < 0.05$) with R^2 's as high as 0.7 occurred with only 2 pods in the analysis, indicating that even a low sample size will provide statistically significant results. We expect to have a suitable sample size given our experience and study design but even if circumstances reduce our sample size, preliminary analyses show valuable data will still be obtained.

Minke whales

The justification of our work on minke whales is as follows: any photographic identifications obtained will be of great importance for the purpose of independently assessing preliminary stock/population estimates. Collecting this data which has not been collected previously will contribute to the existing body of information on minke whales. It will also support our ongoing research as these data will also be of use for evaluating residency times, behaviors, and movements of animals, which are important for confirming some of the assumptions of the passive acoustic survey methods that are proposed for this effort. Photo-ID data have been demonstrated to be useful for these types of studies. This will be the first attempt to start a photo-ID catalog for the stock of minke whales that occur in the Hawaiian Islands.

We are requesting a take of 100 minke whales per year by close approach for Photo-ID within the EEZ of the Main Hawaiian Islands. This take estimate is based preliminary data we have collected in the region of Kauai and Oahu (Norris et al 2005; Martin Pers. Comm.; Oswald et al 2008), but is likely an overestimate of the number of animals we will encounter and approach. Location of research would include waters off all the main Hawaiian

Islands. In this permit we request the following activities to be conducted: to approach individual minke whale animals for the purpose of photo-identification of minke whales as part of a larger acoustic effort that has been submitted as a proposal to the Office of Naval Research (see attached file). The primary goal of this effort is to use passive acoustic methods to assess the distribution, abundance, and acoustic behaviors of minke whales. One aspect of the proposed effort will be to attempt to visually locate animals to verify acoustically determined positions. If we are successful in this aspect of the research effort, we plan also to take photographic identifications of any animals that we visually detect.

Description: see attached application

Supplemental Information

Status of Species:	Humpback whale- endangered All other cetacean species requested - not listed as threatened or endangered
Lethal Take:	Not Applicable
Anticipated Effects on Animals:	Tagging Tagging is increasingly utilized in numerous studies as cited in the previous sections. There is a direct impact from the physical contact of the tag but the impacts are non-adverse, less-than-significant, and considered to be negligible. The proposed tags only attach via suction cup to the skin surface, they do not penetrate, and will most only result in short-term reactions (Calambokidis et al. 2001 and 2004, Hooker et al. 2001). Successful tagging of whales has occurred now for several years, and with a variety of tag types (Watkins 1981, Watkins et al. 1981, 1996, Harvey 1984, Goodyear 1993, Mate and Mate et al. 1998). The use of suction-cup attachment avoids the risk of skin penetration and any resulting injury.

Close approaches such as those needed for tagging would most likely result in short term behavioral responses. Many studies on different large cetacean species have shown only moderate if any responses of whales to the close approach and impact of the activity and then a resumption of normal activities (Whitehead et al. 1990, Brown et al. 1991 and 1994, Weinrich et al. 1992, Clapham and Mattila 1993, Barrett-Lennard et al. 1996, Baker et al. 1998, Gauthier and Sears 1999, Jahoda et al. 2003, etc.). While one paper reported that responses of humpback whales in biopsy studies may be higher than for other species (Gauthier and Sears [1999] reported that fin and blue whales showed a lower reaction to biopsy than did humpback and minke whales), humpback whales have been successfully tagged and approached by many researchers for years on numerous permitted research projects and without significant impacts to the animals or to the species survival or recovery.

Photo-ID
Use of Photographic identification is a decades-old technique used globally with both small and large cetacean species. Common thought and years of analyses have corroborated that this activity does not have adverse impacts to cetacean species. Potential impacts of photo-ID both from our above and below water work are extremely short term, temporary, less than significant, and may result only in temporary disruption of conspecific interactions as a result of close approach harassment. Our photo-ID efforts will not result in any adverse impacts to ESA or MMPA listed species. Any harassment reactions will be documented and observed, and photo-ID efforts will cease if takes become apparent.

Measures to Minimize Effects to Listed Species:	b. Describe any potential effects of incidental harassment: Potential effects from incidental harassment, either from close approach or photo-ID work, is expected to result in nothing more than short-term minor behavioral responses i.e. avoidance, that are not adverse and would be less than significant and would not pose any threat or harm to the movement, survival, and reproduction of the animal or species.
	As in previous studies, and as in our previous permitted activities, we will minimize the potential impacts of both direct and indirect impacts potentially resulting from close approaches or from any of the photo-ID, underwater videography, and tagging efforts by utilizing the following steps: <ul style="list-style-type: none">• We will utilize at all times our extensive knowledge of humpback whale behavior and our observational skill in assessing any possible reactions to our presence;• Our photographic approaches will be short in duration. We will approach the animals at slow speed and obliquely (rather than direct movement towards them) so as to both allow them to continue their activities, and to not overtake or disturb;• We will cease approach after we have obtained suitable identification photographs topside and after our 30 minute underwater video time allotment is complete, or, as soon as after a tag has been deployed;• We will avoid multiple approaches of the same groups of whales on a given day;• We will not work any humpback whale mother/calf group that does not seem "at ease" with our approach or that does not remain in rest mode. We have years of experience working these types of pods, and we are well acquainted with the duration of the rest bouts and any concomitant signs of harassment;

- We will suspend any effort (photo-ID, underwater videography, and/or tagging) if we determine that our activities result in any disruption of normal whale activities;
- We will not travel in front of or too close to, or block any intended path for pairs or small groups of whales that are attempting to stay together. i.e. we will not interfere with any travel or contact between whales;
- We will be especially prudent and cautious when approaching any mother/calf pods, will assess the behavior prior to close approach, and will have stationed experienced observers looking for any indication of take. We will avoid separating or coming between a mother/calf pair;
- Impacts from tagging will be reduced and mitigated whenever possible. We will use small vessels which are relatively quiet acoustically and we will limit the number of close approaches to, and time in pursuit of, an individual or a pod for the purpose of tagging. We will also terminate an approach if an animal shows extreme avoidance or surface behaviors indicating above-average behavioral disturbance;
- Potential adverse impacts will be additionally mitigated by using an experienced collection team; and
- We will avoid cumulative impacts by doing various practices including coordinating our activities with other researchers, and we will avoid any unnecessary duplication or working of the same pods.

Additional steps that will be taken to minimize any detrimental effect of tag attachment will include sterilization of any equipment that would be in contact with the whale and design of the tag-release mechanism to allow detachment of the tag body after tracking is terminated (also necessary for tag retrieval). Research and development into reducing the effects of the tag and attachment techniques will be ongoing throughout the research effort and will be based on feedback from the tagging and deployment results and from other researchers.

Considering the negligible effects that might be expected to occur at the population level and minimal effects at the organismal level, the benefits of the information gained from our proposed tagging effort should outweigh any negative impacts. The data we propose to collect will yield important and perhaps critical information about foraging, reproductive, sensory and behavioral ecology of these species. This information could substantially and directly benefit these populations (and indirectly benefit others) by providing the knowledge necessary for making sound management decisions.

Monitoring effects of activities

Our team consists of trained, senior researchers with years (decades) of experience doing similar or same activities as proposed, along with numerous long time research assistants familiar with whale biology and behaviors and our research protocols. In addition, we have long standing methodologies for data takers who are all trained marine mammal observers, and who are aware of the importance of close and thorough attention for all whale encounters, and citing all behavioral responses. Our data sheets include cells and fields for noting any reactions should they occur. We constantly monitor pods throughout encounters as part of our protocols, having at least one and usually two designated observers, and in addition we survey the animals before approaching for at least 15 minutes and afterwards for the same amount of time on a close approach to determine if they are "suitable" for approach (i.e. not stressed, not reacting to our presence, etc). In any tagging effort, we will monitor animals throughout the deployment by VHF tracking, and when possibly by visual observers. We will increase our post-monitoring time to one-half hour. Whenever possible, photographs will be taken before, during, and after the deployment to show any new marks that may result from tagging (i.e. suction, etc.).

Resources Needed to Accomplish Objectives:	see application
Disposition of Tissues:	Not Applicable
Public Availability of Product/Publications:	Results of our research will be published upon analysis of data, not more than two years after the completion of permit period. Research will be made available to the public and colleagues by the following methods: <div><div>1. Publication in a peer-reviewed journal, such as Marine Mammal Science, Animal Behavior, JASA, etc.;</div><div>2. Presentations at scientific conferences and workshops, including upcoming meetings of the Society for Marine Mammalogy;</div><div>3. Presentations to the general public, such as through NGO or museum lecture series;</div><div>4. Reports to funding and permitting organizations; and</div><div>5. Any Crittercam footage is available to National Geographic to use on any of their programs.</div></div> <div>see application for more info</div>

Location/Take Information

Location

Research Area: Pacific Ocean **State:** HI **Stream Name:** Humpback research: Au-au Channel; minke research: main HI islands **Latitude North:** 22 **Latitude South:** 20 **Longitude East:** 156 **Longitude West:** 158
Location Description: For humpbacks: the Au'au Channel, < 108' deep. The Channel is surrounded by four-islands: Moloka'i, Maui, Kaho'olawe, and Lana'i to the west, resulting in calm, protected waters. For minkes: primarily around Kauai and the other main HI islands.

Take Information

Line Ver	Species	Listing Unit/Stock	Production /Origin	Life Stage	Sex	Expected Take	Takes Per Animal	Take Action	Observe /Collect Method	Procedure	Transport Record	Begin Date	End Date
1	Whale, humpback	Western North Pacific Stock (NMFS Endangered)	Wild	All	Male and Female	1110	3	Harass	Survey, vessel	Acoustic, passive recording; Incidental harassment; Observations, behavioral; Photo-id; Underwater photo/videography	N/A	7/14/2010	7/31/2010
2	Whale, humpback	Western North Pacific Stock (NMFS Endangered)	Wild	Adult	Male and Female	90	3	Harass/Sampling	Survey, vessel	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Underwater photo/videography	N/A	7/14/2010	7/31/2010
	Details: Adult escorts (30 animals tagged/yr)												
3	Whale, humpback	Western North Pacific Stock (NMFS Endangered)	Wild	Adult	Female	150	3	Harass/Sampling	Survey, vessel	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Underwater photo/videography	N/A	7/14/2010	7/31/2010
	Details: Mothers (50 animals tagged/yr)												
4	Whale, humpback	Western North Pacific Stock (NMFS Endangered)	Wild	Calf	Male and Female	150	3	Harass/Sampling	Survey, vessel	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Underwater photo/videography	N/A	7/14/2010	7/31/2010
	Details: Calves (50 animals tagged/yr)												
5	Whale, minke	Hawaiian stock	Wild	All	Male and Female	100	1	Harass	Survey, vessel	Photo-id	N/A	7/14/2010	7/31/2010
6	Whale, pilot, short-finned	Hawaiian stock	Wild	All	Male and Female	1000	1	Harass	Survey, vessel	Incidental harassment	N/A	7/14/2010	7/31/2010
7	Whale, pygmy sperm	Hawaiian stock	Wild	All	Male and Female	1000	1	Harass	Survey, vessel	Incidental harassment	N/A	7/14/2010	7/31/2010
8	Whale, dwarf sperm	Hawaiian Stock	Wild	All	Male and Female	1000	1	Harass	Survey, vessel	Incidental harassment	N/A	7/14/2010	7/31/2010
9	Whale, pygmy killer	Hawaiian Stock	Wild	All	Male and Female	1000	1	Harass	Survey, vessel	Incidental harassment	N/A	7/14/2010	7/31/2010
10	Whale, false killer	Hawaiian Stock	Wild	All	Male and Female	1000	1	Harass	Survey, vessel	Incidental harassment	N/A	7/14/2010	7/31/2010
11	Whale, Cuvier's beaked	Hawaiian Stock	Wild	All	Male and Female	100	1	Harass	Survey, vessel	Incidental harassment	N/A	7/14/2010	7/31/2010
12	Whale, melon-headed	Hawaiian Stock	Wild	All	Male and Female	1000	1	Harass	Survey, vessel	Incidental harassment	N/A	7/14/2010	7/31/2010
13	Dolphin, bottlenose	Hawaiian Stock	Wild	All	Male and Female	1000	1	Harass	Survey, vessel	Incidental harassment	N/A	7/14/2010	7/31/2010

14	Dolphin, Risso's	Hawaiian Stock	Wild	All	Male and Female	100	1	Harass	Survey, vessel	Incidental harassment	N/A	7/14/2010	7/31/2010
15	Dolphin, rough-toothed	Hawaiian Stock	Wild	All	Male and Female	1000	1	Harass	Survey, vessel	Incidental harassment	N/A	7/14/2010	7/31/2010
16	Dolphin, spinner	Hawaiian Stock	Wild	All	Male and Female	1000	1	Harass	Survey, vessel	Incidental harassment	N/A	7/14/2010	7/31/2010
17	Dolphin, pantropical spotted	Hawaiian Stock	Wild	All	Male and Female	100	1	Harass	Survey, vessel	Incidental harassment	N/A	7/14/2010	7/31/2010

NEPA Checklist

1) If your activities will involve equipment (e.g., scientific instruments) or techniques that are new, untested,or otherwise have unknown or uncertain impacts on the biological or physical environment , please discuss the degree to which they are likely to be adopted by others for similar activities or applied more broadly.

Our humpback whale research does involve equipment that is innovative, that ideally would be adopted by other researchers in the future. MANTA tags will be deployed to collect real-time data on the whales while they are underwater. (See section IV. C. 2. b. for more information). These will likely be used by more researchers in the future. We will also be using traditional VHF/TDR tags to ensure data are collected in the event that there are difficulties with the new MANTA tags. A new and innovative aspect of our proposed MANTA system is the combination of an acoustic and VHF telemetry system, an approach highly recommended by colleagues and by a ONR sponsored review on tagging and tracking techniques. In addition, our underwater videography equipment is also unique in design, in that we have the only dual element underwater array that we know of being used on large whales. Our system, while similar to that being used by Adam Pack and others, is the only one which allows for obtaining measure bearings of sounds produced by target animals.

There are no NEPA considerations for the minke whale photo-ID.

2) If your activities involve collecting, handling, or transporting potentially infectious agents or pathogens (e.g., biological specimens such as live animals or blood), or using or transporting hazardous substances (e.g., toxic chemicals), provide a description of the protocols you will use to ensure public health and human safety are not adversely affected, such as by spread of zoonotic diseases or contamination of food or water supplies.

N/A- Our activity does not involve collection, handling, or transport of any sort.

3) Describe the physical characteristics of your project location, including whether you will be working in or near unique geographic areas such as state or National Marine Sanctuaries, Marine Protected Areas, Parks or Wilderness Areas, Wildlife Refuges, Wild and Scenic Rivers, designated Critical Habitat for endangered or threatened species, Essential Fish Habitat, etc. Discuss how your activities could impact the physical environment, such as by direct alteration of substrate during use of bottom trawls, setting nets, anchoring vessels or buoys, erecting blinds or other structures, or ingress and egress of researchers, and measures you will take to minimize these impacts.

N/A – Our activities do not take place in or near protected areas, but do take place in unique geographic areas and will not be impacting the physical environment. We will do some work in Sanctuary waters. Also, we will work in areas that provide predictable high densities of humpback whales. But our activities will not impact the physical environment in any way either by direct alteration or indirectly.

4) Briefly describe important scientific, cultural, or historic resources (e.g., archeological resources, animals used for subsistence, sites listed in or eligible for listing in the National Register of Historic Places) in your project area and discuss measures you will take to ensure your work does not cause loss or destruction of such resources. If your activity will target marine mammals in Alaska or Washington, discuss measures you will take to ensure your project does not adversely affect the availability (e.g., distribution, abundance) or suitability (e.g., food safety) of these animals for subsistence uses.

N/A – Our activities will not affect entities listed in or eligible for listing in the National Register of Historic Places, nor will they cause loss or destruction of scientific, cultural, or historic resources.

5) Discuss whether your project involves activities known or suspected of introducing or spreading invasive species, intentionally or not, (e.g., transporting animals or tissues, discharging ballast water, use of equipment at multiple sites). Describe measures you would take to prevent the possible introduction or spread of non-indigenous or invasive species, including plants, animals, microbes, or other biological agents.

N/A – Our activities will not include actions involving transport of materials, and therefore will not introduce or spread invasive specie

Project Contacts

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Other Personnel:	
Name	Role(s)
Robin William Baird	Co-Investigator
Alexandra Sasha McFarland	Co-Investigator
Tom Norris	Co-Investigator

Attachments

Contact - Ann M Zoidis: C6735T5Ann Zoidis CV.pdf (Added Jan 8, 2008)
Contact - Robin William Baird: C13780T5Baird CV permit application.pdf (Added May 12, 2010)
Contact - Tom Norris: C9130T5Norris Thomas CV.doc (Added Nov 9, 2009)
Location - L27698T314353 humpback study area.doc (Added Nov 9, 2009)
Location - L27698T314353 minke study area.doc (Added Nov 9, 2009)
Project Description - P14353T114353 Final application_11_09.doc (Added Nov 9, 2009)
Project Description - P14353T1Norris_et_al_ONR_Technical_Proposal(22_Dec_2008).doc (Added Nov 9, 2009)

Status

Application Status:	Application Complete		
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- **MMPA/ESA Research/Enhancement permit**
 - Current Status:** Issued **Status Date:** July 14, 2010
 - Section 7 Consultation:** Formal Consultation
 - NEPA Analysis:** Environmental Assessment
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Reports